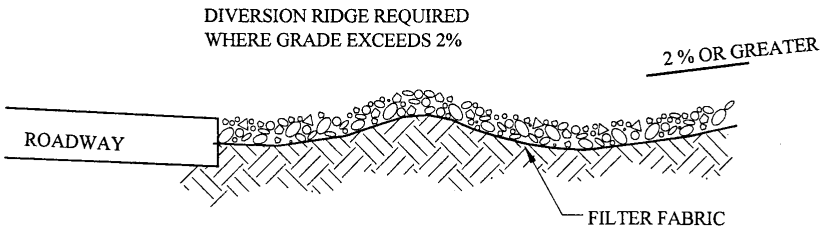
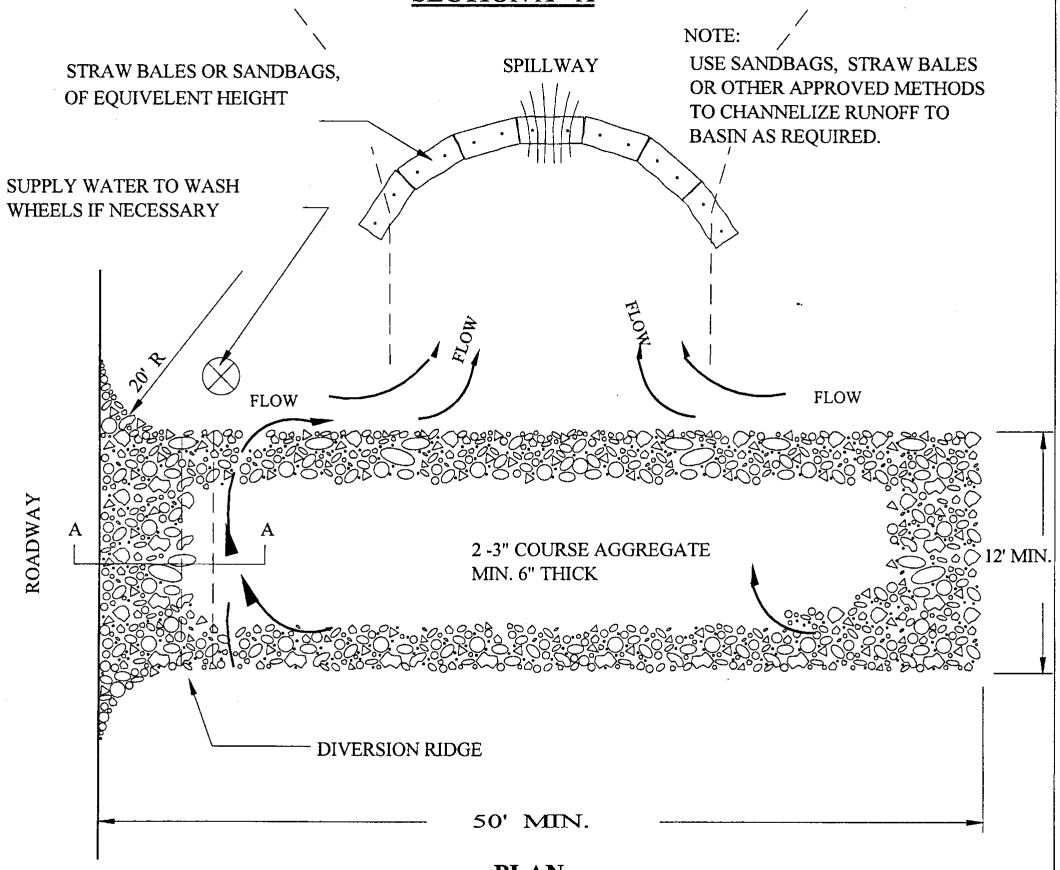


SECTION A - A



PLAN

NOTES:

IF SOILS ARE MAINLY COMPOSED OF CLAYS OR SILTS, USE OF A FILTER FABRIC AS A SEPARATION BARRIER BETWEEN THE ROCK AND SOIL IS RECOMMENDED.

1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABLIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

FIG. E - 11
TEMPORARY
GRAVEL CONSTRUCTION ENTRANCE/EXIT

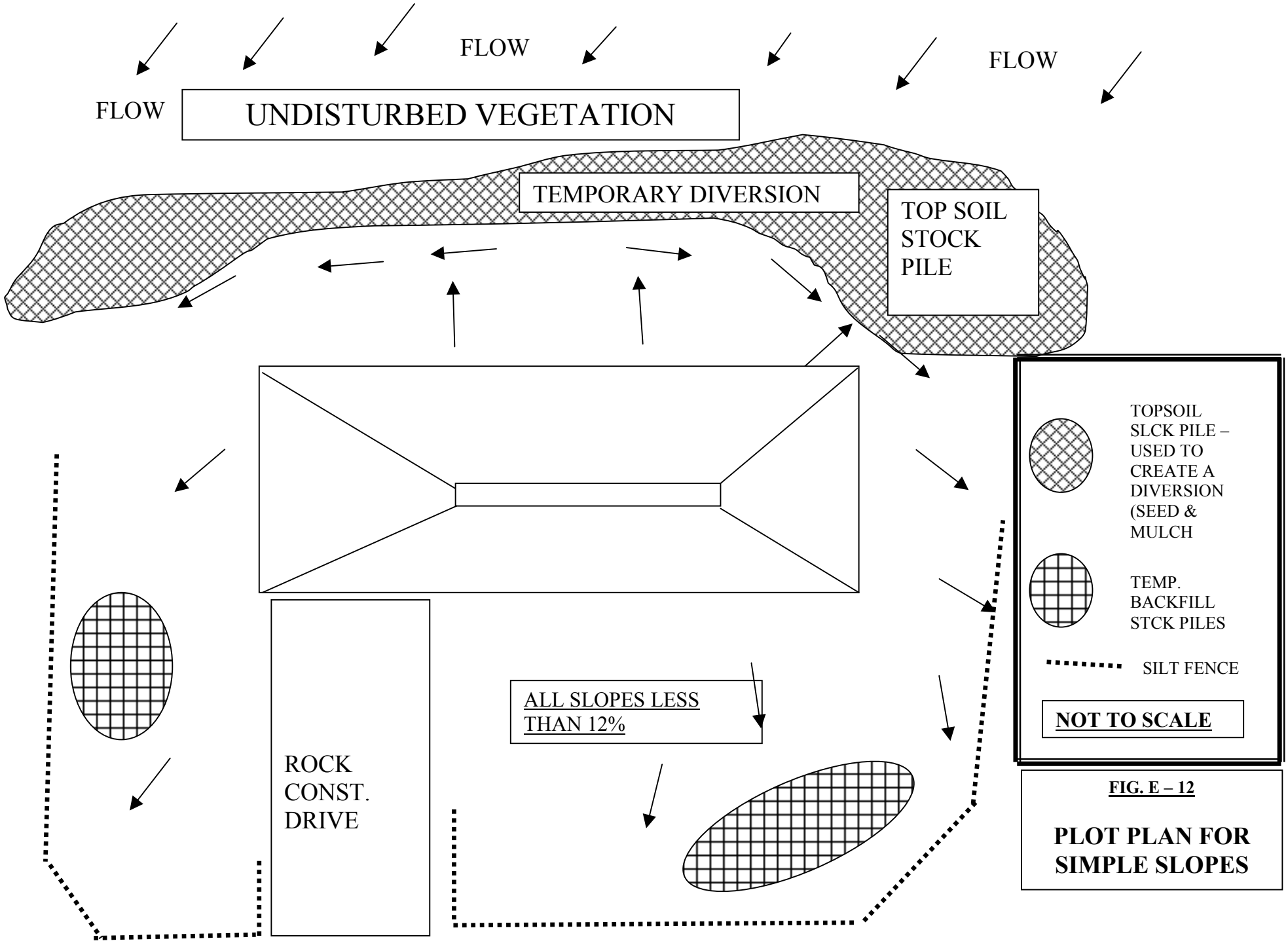


FIG. E – 12

PLOT PLAN FOR SIMPLE SLOPES

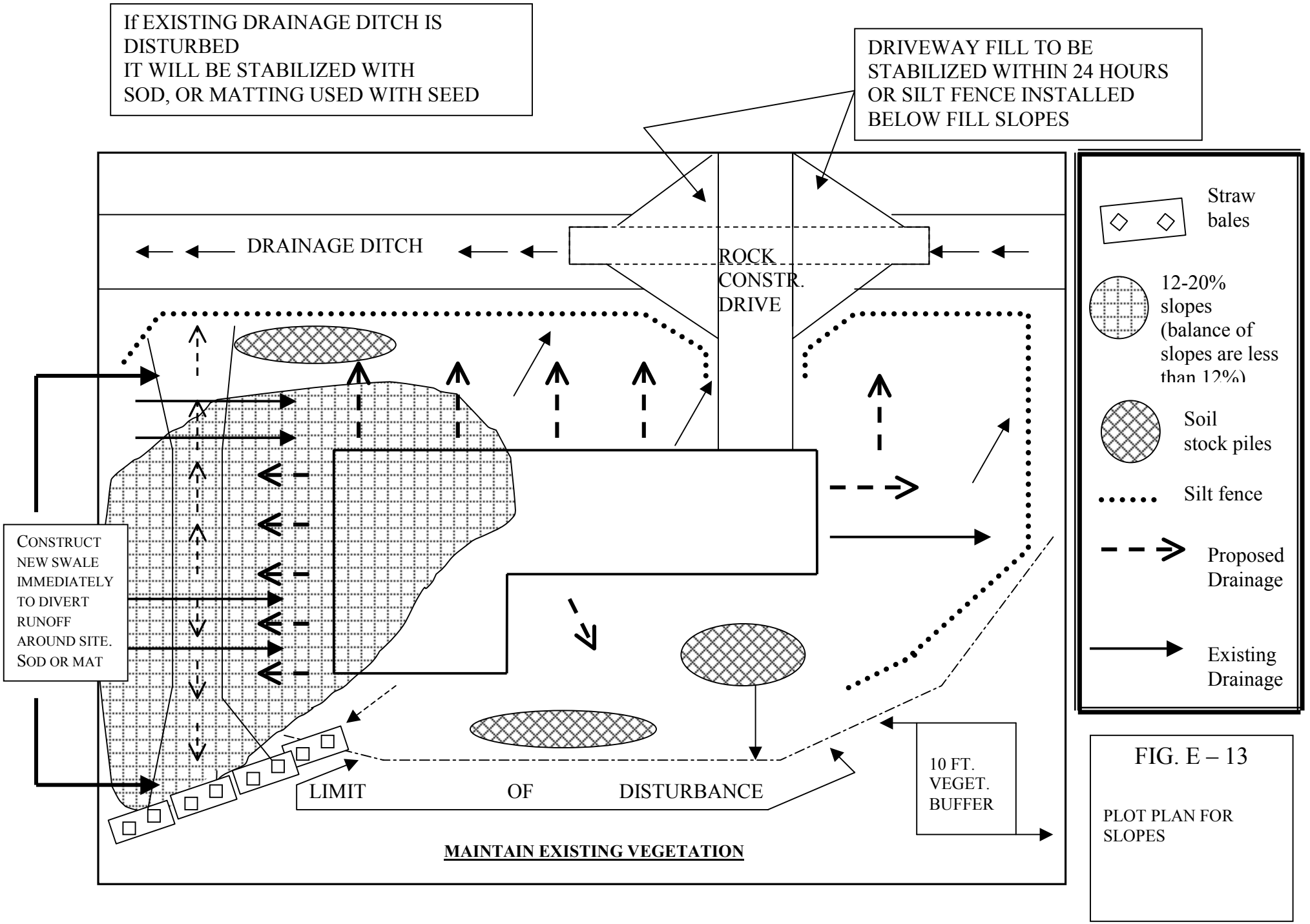
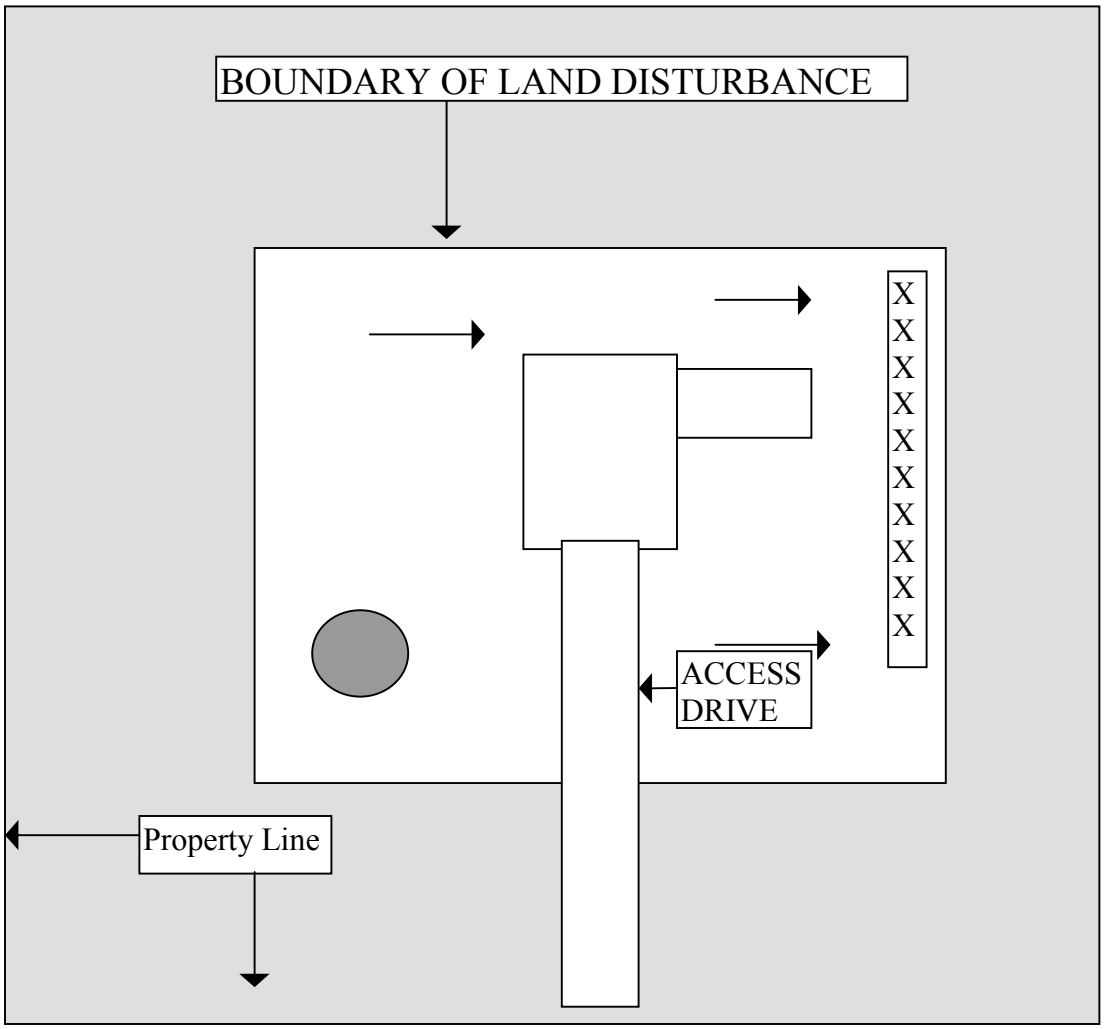


FIG. E – 13

PLOT PLAN FOR SLOPES



KEY

Direction of Slope
(Slopes 12% or less)

XXXXXX Slopes 12-20%

Topsoil Stockpile

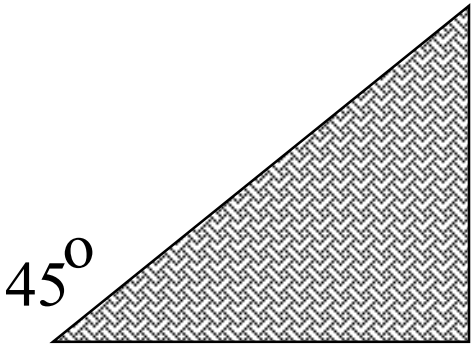
Vegetative Buffer

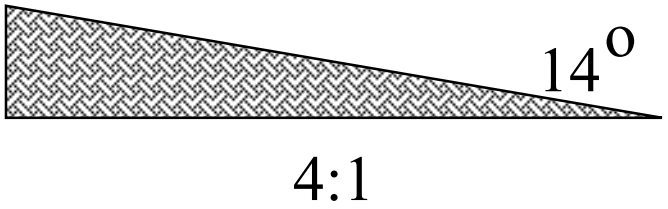
NOTES:

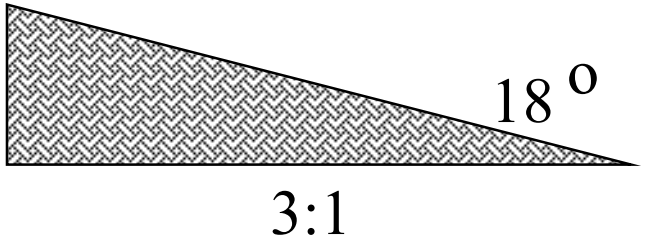
1. **INDICATES BOUNDARY OF LAND DISTURBING ACTIVITY**
2. **INDICATE SLOPES IN DISTURBED AREAS BY RANGES:**
   12% OR LESS
   12-20%
   20% OR STEEPER

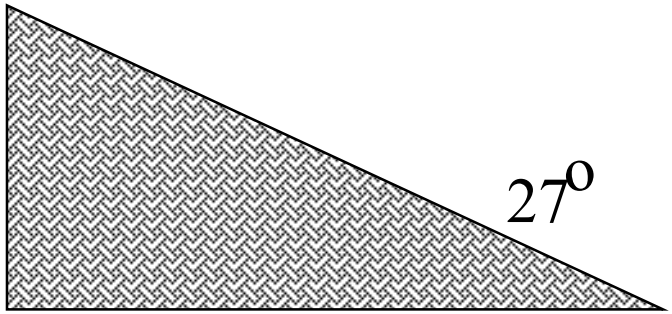
FIG. E – 14

EROSION CONTROL PLAN FOR LARGE LOT

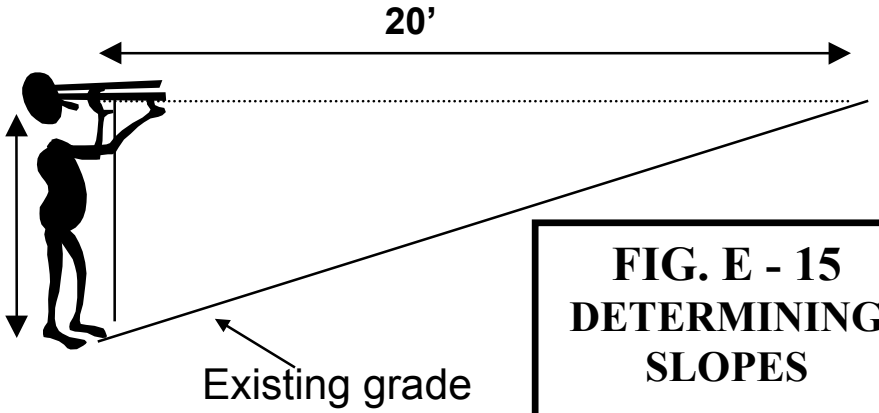








Using hand level available at engineering/drawing supply stores



(ht. From ground to individuals eye level is vert. Dist.)

Calculating Slope Gradient

Vertical distance/horizontal distance x 100 = %of slope

5.5'/20' =.275 x 100 = 27.5%

FIG. E - 15
DETERMINING SLOPES

s. Comm 21.16

Frost Protected Shallow Footings

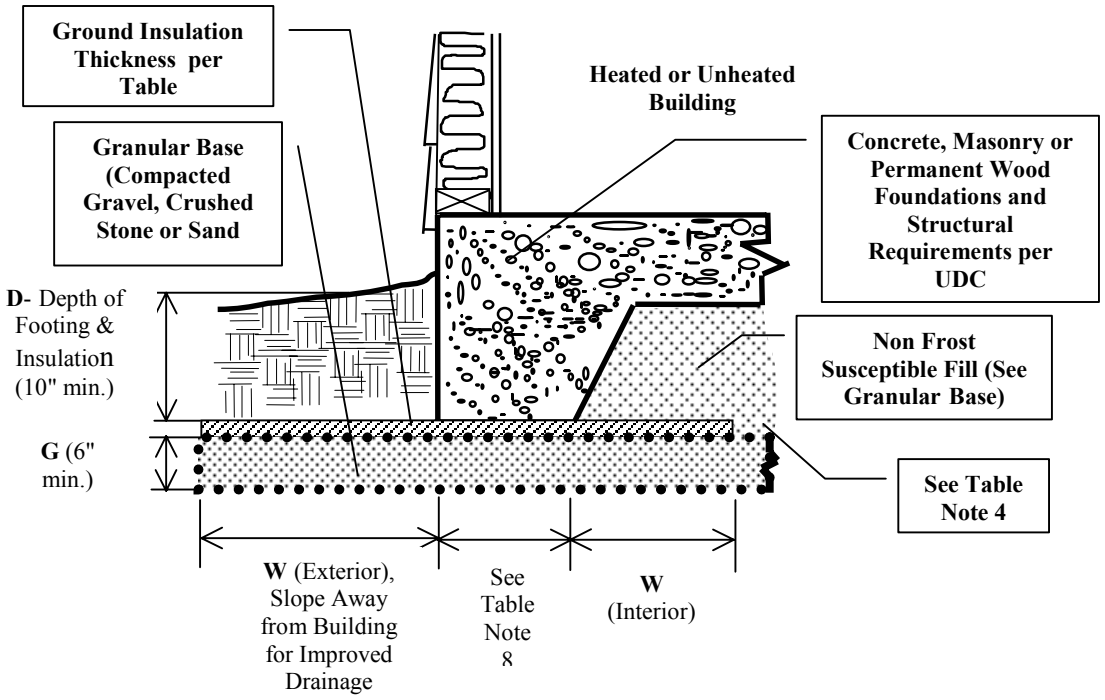
In lieu of frost walls, the following is an acceptable method.

Minimum Ground Insulation Requirements (1)

		Mean Annual Temperature (2, 6)			Minimum Footing Depth (7, 8)	
Air Freezing Index (F-days) (3)	**W-Insulation Width from Edge of Footing (4, 5)**	**38**	**40**	**≥41**	**D-** Concrete Depth	**G-**Granular Base Thickness
2250 or less	63"	NA	NA	2.5"	10"	6"
2251 - 3000	79"	4"	3.5"	3.5"	10"	6"
3001 - 3750	91"	5"	NA	NA	10"	6"

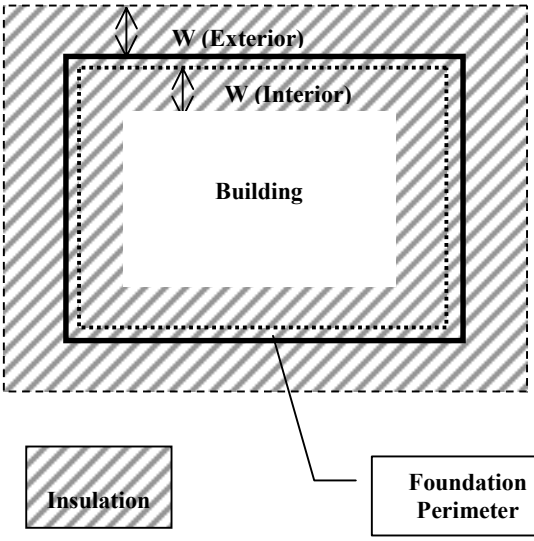
Notes:

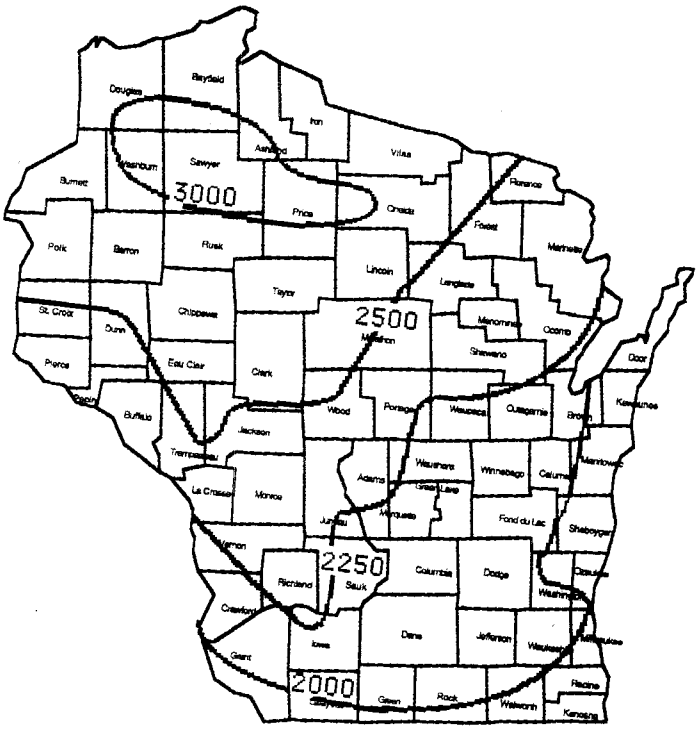
1. Also see s. Comm 22.26 for additional slab-edge insulation requirements.
2. Units are degrees Fahrenheit. See estimate provided on Mean Annual Temperature Contour Map.
3. Air freezing index shall be based on maximum year expected for a 100 year return period. See estimate provided on AFI Contour Map.
4. Ground insulation to the building interior can be extended beneath the entire slab where it is desired to protect the entire slab from frost heave action.
5. Ground insulation to the building interior can be in one horizontal plane (as shown in the detail) and covered with non frost-susceptible fill or the insulation maybe placed directly beneath the slab.
6. Insulation thickness recommendations are for extruded polystyrene (XPS) insulation.
7. The minimum depth of concrete footing and horizontal insulation is 10". A 6" drainage layer is required under the insulation.
8. Insulation placed directly beneath the footing shall be Type IV or Type VI XPS in accordance with ASTM C578. Maximum deadload placed on the Type IV insulation shall be 1200 pounds/square foot. Maximum deadload placed on Type VI shall be 1900 psf.



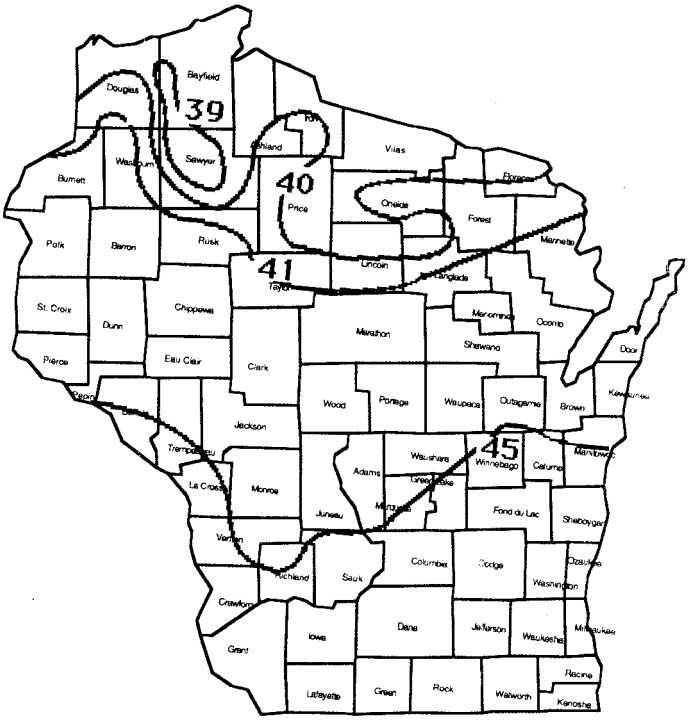
See Appendix Section 22.36 For Slab Edge Insulation Details.

Plan View





Air-Freeze Index Contour Map



Mean Annual Temperature Contour Map

UDC Energy Worksheet Example

The UDC Energy Worksheet is required to be submitted with building plans for plan review prior to issuance of a building permit. Following is a sample dwelling and completed Energy Worksheet. **The sample completed worksheet has been completed for both the Prescriptive Package and System Design Methods for demonstration purposes. Normally only one method is required to be completed for showing code compliance.**

Sample dwelling: Non-Electrically heated single-family dwelling located in Dane County (Zone 3). Has 1,500 square feet and 186 linear feet of perimeter building thermal envelope. Garage is not heated. Estimated infiltration rate is 0.3 air changes per hour. There will be 170 cfm of installed exhaust ventilation.

Gross Above-Foundation Walls:

Wall = 8.09' (97"-1/8") x 186 linear feet = 1,504 square feet

Box sill = 0.81 feet (9-3/4 inches deep: sill, header, subfloor) x 186 linear feet = 151 square feet

Wood 1 x 8-inch drop siding	R = 0.79
1-inch extruded polystyrene sheathing	**R = 5**
R13 batt insulation	**R = 13**
2 x 4 framing, 16 inches O.C.	R = 4.4
1/2-inch drywall finish	R = 0.56

Door area = 38 sq ft

Insulated steel doors	**U = 0.35**

Windows:

Above-Foundation Windows - 150 sq ft

Wood, low-E, argon-filled, double-pane with 1/2" air space, rated by NFRC	**U = 0.35**

Foundation wall window area = 20 square feet

Operable metal w/o thermal break, double pane	**U = 0.87**

Foundation - 8 ft high, 1 ft exposed

8-inch poured concrete	R = 0.8
1-inch extruded polystyrene for full height	**R = 5**

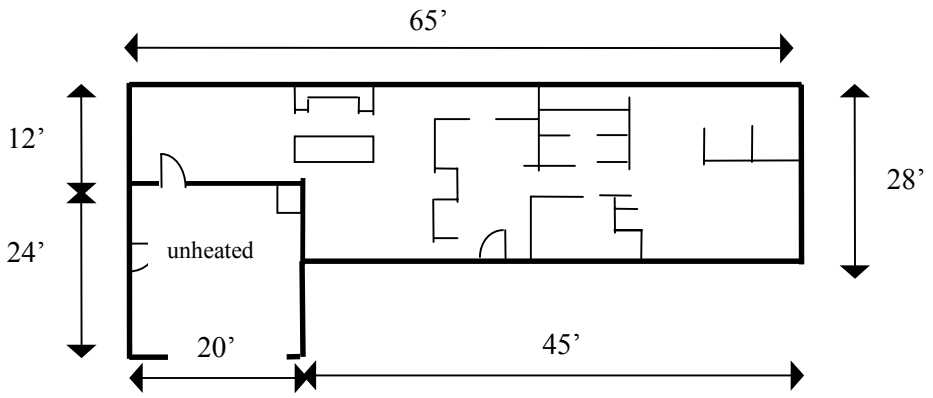
Ceiling - 1,500 square feet, standard roof trusses (no raised heel)

2 x 4 trusses, 24 inches O.C.	R = 4.4
Blown fiberglass insulation	R/inch = 2.5
Insulation in cavity, 16 inches	**R = 40**
Insulation over framing, 12.5 inches	R = 31.25
5/8-inch drywall finish	R = 0.56

Heating Plant

Gas-Fired Hot Air, 90% AFUE	**High Efficiency**

tk\h:\udc\gentech



Submit completed worksheet pages 3-6 with dwelling plans to local enforcing municipality.

Project Address: ***Sample - Zone 3***

Builder: _____ Owner: _____

Worksheet Completed By: _____ Date: _____

Does dwelling unit have three kilowatts or more input capacity of permanently installed electrical space heating equipment?

☐ YES (see below) ☒ NO

You will need to apply the stricter standards shown for electrically-heated homes if you answered "YES" to the above question.

A. Area Calculations

Enter appropriate dimensions to obtain area values. Some calculations will not be necessary depending on home design or calculation method. These calculated areas are referenced elsewhere on this worksheet, for example, "(A.1.)".

1. Window, Skylight & Patio Door Area (overall unit area) a. In Above- Foundation Walls b. In Foundation Walls ***150*** sq. ft. ***20*** sq. ft. c. Total (a. + b.) = ***170***	2. Opaque Door Area a. In Above- Foundation Walls b. In Foundation Walls ***38*** sq. ft. ***0*** sq. ft. c. Total (a. + b.) = ***38***
3. Gross Exposed Basement Wall Area ***1' x 186'*** ***186*** sq. ft.	4. Basement Wall Area Below Grade ***7' x 186'*** ***1302*** sq. ft.
5. Opaque [1] Basement Wall Area (A.3. + A.4. - A.1.b.- A.2.b.) ***186 + 1302 - 20 - 0*** ***1468*** sq. ft. If the exposed area of A.3.is greater than the below grade area of A.4., add A.5. to A.7 and cross out the number in this cell.	6. Gross Heated Above-Foundation Wall Area, **including boxsill** ***1504 + 151*** ***1655*** sq. ft.
7. Above Foundation Code Wall Area (A.6. + A1.b. + A.2.b.) ***1655 + 20 + 0*** ***1675*** sq. ft.	8. Opaque [1] Above-Foundation Wall Area (A.6. - A1.a. - A.2.a.) ***1655 - 150 - 38*** ***1467*** sq. ft.
9. Floor Area Over Interior Unconditioned Spaces Less Than 50° ***0*** sq. ft.	10. Insulated Roof Or Ceiling (less skylights) ***28 x 45 = 1260*** ***12 x 20 = 240*** ***1500*** sq. ft.
11. Exterior Floor Area (Overhangs) ***0*** sq. ft.	12. Crawl Space Wall Area ***0*** sq. ft.
13. Slab On Grade (above or less than 12 inches below grade) ***0*** lineal feet of slab perimeter	14. Total Heated Envelope Area (A.5 + A.7 + A.9 + A.10 +A.11 + A.12 +(A.13. X 2')) ***1468 + 1675 + 0 + 1500 + 0 + 0 + 0*** ***4643*** sq. ft.
15. Percent Glazing (for Prescriptive Package Method, Section B, only) (A.1.c. ÷ A.7. X 100%) ***170 ÷ 1675 x 100%*** ***10.2*** %	16. Windows Description - Above-Foundation Windows: Frame type: ☒ Wood or Wood Clad ☐ Vinyl ☐ Metal Glazing type: ☒ Dual ☐ Triple ☐ Dual w/storm panel Dual-Glazing Air Space: ☐ 1/4' ☐ 3/8" ☒ 1/2" or more Features: ☒ Low-E ☒ Argon-filled ☐ Suspended film Foundation Windows: ☐ Vinyl ☒ Metal

B. Prescriptive Package Method (Skip this section if using the System Design Method of Sections C-F)

The prescriptive package method is the simplest method for determining compliance with the UDC insulation and window requirements. To use the prescriptive package method, enter your actual design values in the "Actual " row below. **For a component, with two or more areas of different insulation levels**, **such as windows,** either use the least insulating value for both areas or use the Weighted Average tables below. Multiply your % glazing by the glazing U-value to obtain your "Glazing Factor". Find the Prescriptive Table that applies to your space heating fuel and sheathing type. Select a package from the table that most closely matches the construction indicated on your plans. **Do not exceed the package U-values or glazing factor or fall below the package R-values with your design.** Transfer the R-Values and U-values to the blank table below in the "Allowed" row. Then proceed to Section F. See page 2 for detailed instructions for this section.

	Package #	% glazing	U glazing	Glazing Factor (% glazing × U glazing)	R wall	R ceiling	R Bsmt, Crawl Space, Slab or Floor	U door	U overall	Equip. Eff.
Actual	------	***10.2*** % (A.15)	***0.41***	***0.042***	***R13 + 5***	***R40***	***R5***	***0.35***	----------	***High***
Allowed	***45***	----------	----------	***0.0504*** Max	***R18, I*** Min	***R40*** Min	***R5*** Min	***0.35*** Max	***0.086***	***High***

(Please go to Section F.)

Optional R-Value/U-Value Weighted Average Table for Component: ***Windows***

Component Construction Description	R Value	U-Value (1÷R Value)	Area (sq ft)	U-Value × Area (UA)
Basement windows		***0.87***	***20***	***17.4***
Above-foundation windows		***0.35***	***150***	***52.5***
			Total Area = ***170***	Total UA = ***69.9***

69.9 (Total UA) ÷ ***170*** (Total Area) = ***0.41*** (Weighted Average U-Value (for windows or doors))

_____ (Total Area) ÷ _____ (Total UA) = _____ (Weighted Average R-Value (for all other components))

Optional R-Value/U-Value Weighted Average Table for Component:

Component Construction Description	R Value	U-Value (1÷R Value)	Area (sq ft)	U-Value × Area (UA)
			Total Area =	Total UA =

_____ (Total UA) ÷ _____ (Total Area) = _____ (Weighted Average U-Value (for windows or doors))

_____ (Total Area) ÷ _____ (Total UA) = _____ (Weighted Average R-Value (for all other components))

Because the sample house fit a Package, you would normally skip ahead to Section F. For demonstration purposes here. the System Design Method is also completed.

C. Code-Allowed Heat Loss For System Design Method

Enter area values from Section A as notated and temperature differences per footnote 2 into this table and then multiply across by the electric or non-electric code-required U-value. Total the right column to find the total allowed heat loss factor.

Component	Area From Sect A.	× Required U-Value		= Heat Loss UA
		☒ NON-ELEC	☐ ELECTRIC	
1. Opaque Basement Wall [2]	***1468*** (A.5.)	0.077 [3]	0.077 [3]	***113***
2. Above Foundation Code Wall	***1675*** (A.7.)	0.110	0.080	***184***
3. Floor Over Interior Unconditioned Space	(A.9.)	0.050	0.050	
4. Roof or Ceiling	***1500*** (A.10.)	0.026	0.020	***39***
5. Floor Over Exterior	(A.11.)	0.033	0.033	
6. Crawl Space Wall	(A.12.)	0.060	0.060	
7. Slab On Grade ☐ Unheated ☐ Heated [3]	(A.13.) Lin. ft.	0.72 'F' 0.70 'F'	0.68 'F' 0.68' F'	
8. Subtotal				***336***
9. Credit for High Efficiency Heating Plant: 1.18 for furnace or boiler >90% AFUE; 1.15 for heat pump> 7.8 HPSF, Otherwise use 1.0				× ***1.18***
10. Total Code-Allowed Heat Loss Factor				***396.5***

D. System Design Method - Actual 'U' Values Of Your Home's Components

D.1. Above-Foundation Components - If applicable, check the appropriate typical component constructions listed below, and use the pre-calculated U values. If your wall construction is not listed, you may obtain a pre-calculated U value from the default U-Value tables in the UDC Appendix. (Note that the default Table 2 Wood Frame U-values assume no insulating sheathing which penalizes you if your wall does have insulating sheathing, then you may need to use the Manual Calculation section below.) If you are using exterior metal framing, then you must use the Metal-Frame Wall U-Values of the UDC Appendix. If your component construction is not listed here or in the default tables, you need to use the Manual Calculation section below to manually enter R-values for the different layers of building materials from the Typical Thermal Properties of Building Materials Table of the UDC Appendix, ASHRAE Fundamentals Manual or manufacturer's specifications. Total them across and then obtain the U-value by taking the reciprocal (1/R) of the total R-value.

Above-Foundation Walls	☐ 2X4, 16" O.C., R-13 batt, R-1 board: U - .079	☐ 2X4, 16" O.C., R-13 batt, R-5 board: U - .061
	☐ 2X6, 16" O.C., R-19 batt, R-1 board: U - .059	☐ 2X6, 16" O.C., R-19 batt, R-5 board: U - .049
☐ Other - describe:		U - from Default Table
Roof or Ceiling	☐ 2X4 truss, 24" O.C., with R-38 insulation: U - .030	☐ 2X4 truss, 24" O.C., with R-52 insulation: U - .025
	☐ 2X12 cathedral ceiling, 16" O.C., with R-38 insulation U - .027	
☒ Other - describe: ***R40 with regular trusses***		U - ***0.029*** from Default Table ***1***
Floor Over Exterior or Unconditioned Space	☐ 2X10 joists, 16" O.C., R-19 batt: U - .047	
☐ Other - describe:		U - from Default Table

Optional Manual U-Value Calculation (if assembly not listed above)

Component Name	Cavity Or Solid If Applicable	Ext. Air Film*	Ext. Finish	Insulation Over Framing	Shea-thing	Framing Or Solid	Insulation Within Cavity	Inter-ior Finish	Int. Air Film*	Total R-Value	U-Value
Above Foundation	Cavity	***.17***	***0.79***	***5.0***		----------	***13***	***0.56***	***.68***	***20.2***	***.050***
Wall	Solid	***.17***	***0.79***	***5.0***		***4.4***	----------	***0.56***	***.68***	***11.6***	***.086***
	Cavity					----------					
	Solid						----------				

*** Air Film R-Values**

Location	Heat Flow Direction		
	Upwards	Horizontal	Downwards
Exterior	.17	.17	.17
Interior	.61	.68	.92

D.2. Foundation And Slab-On-Grade Components - Check appropriate boxes for planned type of construction to determine pre-calculated overall 'U-value' including air films, wall, insulation, soil and cavity/solid differences. Slab on grade F-values are per lineal foot of slab perimeter.

Component Type	U-Value	
Foundation Wall	**Basement**	**Crawl Space**
☐ Masonry or concrete wall without insulation	0.360	0.477
☒ Masonry or concrete wall with R-5 insulation board for full height	(0.115)	0.136
☐ Masonry or concrete wall with R-10 insulation board or R-11 insulation batt and 2X4's for full height	0.072	0.081
☐ Permanent wood foundation with R-19 batt for full height	0.054	0.059
☐ Basement or crawl space floor without insulation	0.025	0.025
Slab-On-Grade (or within 12" of grade)	**F-Value**	
☐ Slab-on-grade without insulation	1.04	
☐ Slab-on-grade with R-5 insulation for 48" total horizontal and vertical application	0.74	
☐ Slab-on-grade with R-10 insulation board for 48" total application	0.68	

D.3. Windows And Doors - Use manufacturer's specifications for window and glazed door values, if they were determined per NFRC Std 100, to enter into Table E. Otherwise see default tables of UDC s. Comm 22.05 for U-values.

E. System Design Method - Calculated Envelope Heat Loss Factor Of Your Home

Enter values into table from elsewhere on this worksheet and multiply across to find the actual heat loss factor of each component. If using pre-calculated component U-values, **do not calculate separate cavity and solid figures or apply wood frame factors**. Total component heat loss factors in right column to find total envelope heat loss factors.

Component	Cavity Or Solid If Applicable	Area From Sect. A	× Wood Frame Factor**	× Actual 'U' Value From Sect. D	= Heat Loss Factor (UA)
Above-Foundation Windows	----------	***150*** (A.1.a.)	----------	***0.35***	***52.5***
Foundation Windows	----------	***20*** (A.1.b)	----------	***0.87***	***17.4***
Doors	----------	***38*** (A.2.c)	----------	***0.35***	***13.3***
Opaque Basement Wall	----------	***1468*** (A.5.)	----------	***0.115***	***168.8***
Opaque Above-Foundation Wall	Cavity		***.75***	***.050***	***55***
	Solid	***1467*** (A.8.)	***.25***	***.086***	***31.5***
Floor Over Unconditioned Spaces	Cavity				
	Solid	(A.9.)			
Roof or Ceiling	Cavity				
	Solid	***1500*** (A.10.)		***0.029***	***43.5***
Floor Over Exterior	Cavity				
	Solid	(A.11.)			
Crawl Space Wall	----------	(A.12.)	----------		
Slab On Grade	----------	(A.13.)Lin. ft.	----------	F-Value	
Total Calculated Envelope Heat Loss Factor- Not to exceed Total Code Allowed Heat Loss Factor of line 10 of Section C. (Enter here: ***396.5***)by more than 1%					***382***

** Adjustment Factors For Wood-Framed Components - Do not apply if your are using a pre-calculated or default U-Value.

Spacing Of Framing Members	Stud Walls		Joists/Rafters	
	Cavity	Solid	Cavity	Solid
12"	.70	.30	.86	.14
16"	.75	.25	.90	.10
24"	.78	.22	.93	.07

F. Heat Loss Factor Due to Air Infiltration (for heating equipment sizing)

Enter appropriate values. A maximum infiltration air change rate of 0.5 per hour is allowed in addition to ventilation losses.

Floor Level	Area (sq ft)	× Height (ft)	Fan Capacity (cfm)	× Constant	× Air Changes Per Hour	= Heat Loss Factor(UA)
Basement	***1500***	***8***	---------	.018	***0.3***	***64.8***
Level 1	***1500***	***8***	---------	.018	***0.3***	***64.8***
Level 2			---------	.018		
Level 3			---------	.018		
Ventilation	----------	----------	***170***	.432	----------	***73.4***
Total Infiltration & Ventilation Heat Loss Factor						***203***

G. Heating Equipment Sizing

Enter appropriate value to determine the maximum and minimum allowable heating equipment capacity in BTUs/HR. A more detailed calculation may be submitted to the local code official. [4]

Prescriptive Package Method:	***0.086*** **U overall** from selected Prescriptive Package of Section B	×	***4643*** Total Envelope Area (A.14.)	= ***399.3***
OR System Design Method: Calculated Heat Loss Factor from Sect. E.				
Infiltration & Ventilation Heat Loss Factor (from Sect. F.)				+ ***203***
Total Heat Loss Factor (UA)				= ***602.3***
Temperature Difference from Zone Table on page 1				× ***85***
Minimum Heating Equipment Output				= ***51,196***
Allowable Heating Equipment Size Margin Multiplier				× 1.15
Maximum Allowable Heating Equipment Output [5]				= ***58,875***
Planned Furnace Output Or Boiler IBR Rating				***60,000***
Make & Model if High Efficiency Credit has been taken: ***Acme XLH60K***				

Prescriptive Package Tables (Corrected)

(See notes on page 2 of Energy Worksheet; I = insulating sheathing, RT = raised heel roof truss)

Table B-1 Prescriptive packages, Non-electric Heat, Structural Sheathing only

Package	Glazing Factor	R wall	R ceiling	R basement	U door	U overall	HVAC Equipment Efficiency
1	0.0370	R21	R42	R7	0.35	0.073	Normal
2	0.0264	R21	R51, RT	R5	0.35	0.073	Normal
3	0.0333	R15	R42	R10	0.35	0.073	Normal
4	0.0440	R19	R33	R10	0.35	0.073	Normal
5	0.0330	R13	R42	R11	0.35	0.073	Normal
6	0.0480	R19	R33	R11	0.35	0.073	Normal
7	0.0600	R21	R47	R11	0.35	0.073	Normal
8	0.0407	R13	R44	R13	0.35	0.073	Normal
9	0.0600	R19	R42	R13	0.35	0.073	Normal
10	0.0680	R21	R38, RT	R13	0.35	0.073	Normal
11	0.0296	R13	R49	R5	0.35	0.086	High
12	0.0440	R19	R30	R5	0.35	0.086	High
13	0.0520	R21	R33	R5	0.35	0.086	High
14	0.0720	R13	R47	R10	0.35	0.086	High
15	0.0784	R19	R38	R10	0.47	0.086	High
16	0.0640	R13	R33	R11	0.47	0.086	High
17	0.0896	R19	R49	R11	0.35	0.086	High
18	0.0896	R21	R34	R11	0.35	0.086	High
19	0.0920	R19	R34	R11	0.47	0.086	High
20	0.0840	R13	R49	R13	0.35	0.086	High
21	0.0840	R19	R30	R13	0.47	0.086	High
22	0.0896	R21	R31	R13	0.47	0.086	High
Package	**Glazing Factor**	**R wall**	**R ceiling**	**R crawl**	**U door**	**U overall**	**HVAC Equipment Efficiency**
23	0.0520	R19	R34	R19	0.47	0.070	Normal
24	0.0672	R13	R36	R19	0.47	0.083	High
25	0.0720	R13	R33	R19	0.47	0.083	High
Package	**Glazing Factor**	**R wall**	**R ceiling**	**R slab**	**U door**	**U overall**	**HVAC Equipment Efficiency**
26	0.0560	R21	R36	R5	0.47	0.103	Normal
27	0.0728	R13	R36	R5	0.47	0.121	High
28	0.0760	R13	R34	R5	0.47	0.121	High
Package	**Glazing Factor**	**R wall**	**R ceiling**	**R heated-slab**	**U door**	**U overall**	**HVAC Equipment Efficiency**
29	0.0560	R21	R47	R5	0.47	0.101	Normal
30	0.0728	R13	R42	R5	0.47	0.120	High
31	0.0760	R13	R38	R5	0.47	0.120	High
Package	**Glazing Factor**	**R wall**	**R ceiling**	**R floor**	**U door**	**U overall**	**HVAC Equipment Efficiency**
32	0.0480	R19	R47	R19	0.35	0.065	Normal
33	0.0728	R19	R36	R19	0.47	0.077	High
34	0.0560	R13	R34	R19	0.47	0.077	High

Table B-2 Prescriptive packages, Non-electric Heat, Insulating Sheathing

Package	Glazing Factor	R wall	R ceiling	R basement	U door	U overall	HVAC Equipment Efficiency
35	0.0370	R20, I	R42	R7	0.35	0.073	Normal
36	0.0363	R28, I	R38, RT	R5	0.35	0.073	Normal
37	0.0552	R18, I	R44	R10	0.35	0.073	Normal
38	0.0560	R20, I	R47	R10	0.35	0.073	Normal
39	0.0560	R23, I	R34	R10	0.35	0.073	Normal
40	0.0560	R18, I	R47	R11	0.35	0.073	Normal
41	0.0616	R23, I	R42	R11	0.35	0.073	Normal
42	0.0546	R18, I	R44	R11	0.35	0.073	Normal
43	0.0672	R23, I	R40	R13	0.35	0.073	Normal
44	0.0720	R25, I	R36	R13	0.35	0.073	Normal
45	0.0504	R18, I	R40	R5	0.35	0.086	High
46	0.0560	R19, I	R47	R5	0.35	0.086	High
47	0.0560	R23, I	R38	R5	0.47	0.086	High
48	0.0600	R25, I	R38	R5	0.47	0.086	High
49	0.0680	R26, I	R42	R5	0.35	0.086	High
50	0.0680	R28, I	R47	R5	0.47	0.086	High
51	0.0672	R26, I	R47	R5	0.35	0.086	High
52	0.0672	R28, I	R38	R5	0.35	0.086	High
53	0.0720	R20, I	R42	R7	0.47	0.086	High
54	0.0855	R18, I	R36	R11	0.35	0.086	High

Wisconsin Uniform Dwelling Code
Energy Worksheet

Instructions: This worksheet is a Safety & Buildings Division (S&BD)-approved method of manually showing compliance with the energy conservation and heating equipment sizing requirements of the Uniform Dwelling Code (UDC), for new dwelling permits **submitted on or after February 1, 1999**. It may be necessary for the user to purchase a copy of the UDC from State Document Sales, (608)266-3358. Additional information is printed in the UDC Commentary, which is available for a fee, as are blank copies of this form, from S&BD at POB 2509, Madison, WI 53701, Tel. 608-267-4405. **Earlier editions of this worksheet may NOT be used**. Numbers in brackets, [1], refer to the footnotes printed on page 2.

You may also submit completed worksheets from the computer program WIS*check*, which is available for free download from http://www.energycodes.org/ on the Internet.

A required U-value is the **maximum** acceptable heat transmittance for an element. A required insulation R-value is the **minimum** acceptable level of resistance to heat transmittance. (U-values and R-values are reciprocals of each other.) If a component includes two or more areas of different insulation levels, either use the less insulating value for both areas, or use the Optional Weighted Average table in the **Prescriptive Package Method** section or enter separate areas and insulation values in the **System Design Method**. All "U" values must be carried to four places after the decimal point, rounded to three places. Other values may be rounded to the whole number.

Window and door U-values must be tested and documented by the manufacturer in accordance with the National Fenestration Rating Council (NFRC) test procedures or be taken from the glazing U-value table in s. Comm 22.05. Center-of-glass U-values cannot be used. If a door contains glass and an aggregate U-value rating for that door is not available, include the glass area of the door with your windows and use the opaque door U-value to determine compliance of the door.

The code gives credit for **high-efficiency heating equipment**. "High-Efficiency" means a furnace with an AFUE of 90% or more, or a heat pump with an HSPF of 7.8 or more without the use of electric resistance backup heat of greater than 3 kilowatts. If you plan to install more than one piece of heating equipment, the equipment with the lowest efficiency must exceed the efficiency required by the selected package.

Choice of Method: You have the choice of using the Prescriptive Package Method or the System Design Method to show code compliance. For the simpler **Prescriptive Package Method** , which is recommended for standard designs, complete Sections **A., B., F., and G**. Instructions are on page 2. You will be first calculating component areas, then comparing your planned insulation levels to the required insulation levels of the Prescriptive Packages. You will then calculate infiltration and ventilation heat losses to size your heating equipment. If you cannot comply with one of the prescriptive packages, you may be able to show compliance by the System Design Method.

For the **System Design Method**, which is recommended for alternative designs in which more insulation is installed in one component to offset less in another, complete **Sections A., C., D., E., F. and G.** You will be first calculating component areas, then a code-allowed heat loss factor, then component U- and R-values and then your calculated heat loss factor which you will compare to the code-allowed heat loss factor. You will then calculate infiltration and ventilation heat losses to size your heating equipment.

The **County Zone Table** below is use for determining the temperature difference for sizing your heating plant in Section G. You may submit to your local code official more exact calculations to size your heating equipment.

Zone 1 - 95 degrees	Zone 2 - 90 degrees	Zone 3 - 85 degrees	Zone 4 - 80 degrees
Ashland, Barron, Bayfield, Burnett, Chippewa, Douglas, Dunn, Florence, Forest, Iron, Lincoln, Oneida, Pierce, Polk, Price, Rusk, Saint Croix, Sawyer, Taylor, Vilas, Washburn	Adams, Buffalo, Clark, Eau Claire, Jackson, Juneau, LaCrosse, Langlade, Marathon, Marinette, Menominee, Monroe, Portage, Shawano, Oconto, Pepin, Trempeleau, Vernon, Waupaca, Wood	Brown, Calumet, Columbia, Crawford, Dane, Dodge, Door, Fond du Lac, Grant, Green, Green Lake, Iowa, Kewaunee, LaFayette, Manitowoc, Marquette, Outagamie, Richland, Sauk, Sheboygan, Waushara, Winnebago	Jefferson, Kenosha, Milwaukee, Ozaukee, Racine, Rock, Walworth, Washington, Waukesha

Detailed Instructions for Section B. Prescriptive Package Method:

R-value requirements are for insulation only and do not include structural components.

For a component with two or more areas of different insulation levels, either use the least insulating value for both areas or use the Weighted Average tables on page 4.

Wall R-values represent the sum of the wall cavity insulation plus insulating sheathing, if used. Do not include exterior siding, structural sheathing or interior drywall. For example, an R-20 requirement could be met *EITHER* by R-15 cavity insulation plus R-5 sheathing *OR* R-13 cavity insulation plus R-7 sheathing. Note that there are separate tables for walls with structural sheathing only and for walls with insulating sheathing. To use a table for insulating sheathing, the sheathing used must be at least R-4, except that at least R-2 insulation may be provided over corner bracing. Table wall R-Values apply to wood-frame or mass (concrete, masonry, log) wall assemblies, but not to metal-frame construction. If metal frame is planned, use the adjusted R-Values from the Metal-Frame Wall Tables of the UDC Appendix. Table wall values apply to boxsills.

Ceiling R-values represent the sum of the cavity insulation plus insulating sheathing, if used. For ventilated ceilings, any insulating sheathing must be placed between the conditioned space and the ventilated portion of the roof. Ceiling R-values with **"RT**" indicates that a raised-heel truss or oversized truss construction must be used so that the insulation achieves the full insulation thickness over the exterior walls.

Floor requirements apply to floors over unconditioned spaces (such as un-insulated crawlspaces, basements and garages). Floors over outside air shall have a Uoverall = 0.033 or R-30 added insulation.

"Heated-Slab" requirements apply to slabs that contain heat ducts or pipes. All slab insulation must extend at least 48 inches either 1) down from the top of the slab, or 2) down from the top of the slab to the bottom of the slab and then horizontally underneath the slab, or 3) down from the top of the slab to the bottom of the slab and then horizontally away from the slab, with pavement or at least 10 inches of soil covering the horizontal insulation.

Walls of basements below un-insulated floors must be insulated from the top of the basement wall to the level of the basement floor. Conditioned basement windows and glass doors must be included with the other glazing. Exterior basement doors must meet the door U-value requirements. If more than 50% of the basement is exposed, then all of the basement walls must instead meet the above-foundation wall requirements.

Crawl space wall R-value requirements are for walls of unventilated crawlspaces. The crawlspace wall insulation must extend from the top of the wall (including the sill plate) to at least 12 inches below the outside finished grade. If the distance from the outside finished grade to the top of the footing is less than 12 inches, the insulation must extend a total vertical plus horizontal distance of 24 inches from the outside finished grade.

Footnotes for worksheet:

[1] Opaque wall area is wall area minus opening areas of doors and windows.

[2] These below-grade U-values have the insulating value of the soil added to the code-required U-values which apply to the building materials only. See Sect. D.2. for typical insulated component U-values.

[3] These slab-on-grade F-values are derived from the code-required U-values and include the heat loss through the edge and body of the slab. See Sect. D.2. Temperature difference is the same as for above-grade spaces.

[4] For building additions, show that the existing heating equipment, if used to heat the addition, is large enough. To do so, you must calculate the heat loss of the whole building.

[5] If desired manufacturer does not have a furnace of this size, then a designer may select the manufacturer's next larger size.

Submit completed worksheet pages 3-6 with dwelling plans to local enforcing municipality.

Project Address: _____

Builder: _____ Owner: _____

Worksheet Completed By: _____ Date: _____

Does dwelling unit have three kilowatts or more input capacity of permanently installed electrical space heating equipment?

☐ YES (see below) ☐ NO

You will need to apply the stricter standards shown for electrically-heated homes if you answered "YES" to the above question.

A. Area Calculations

Enter appropriate dimensions to obtain area values. Some calculations will not be necessary depending on home design or calculation method. These calculated areas are referenced elsewhere on this worksheet, for example, "(A.1.)".

1. Window, Skylight & Patio Door Area (overall unit area) a. In Above-Foundation Walls b. In Foundation Walls _____ sq. ft. _____ sq. ft. c. Total (a. + b.) = _____	2. Opaque Door Area a. In Above- Foundation Walls b. In Foundation Walls _____ sq. ft. _____ sq. ft. c. Total (a. + b.) = _____
3. Gross Exposed Basement Wall Area _____ sq. ft.	4. Basement Wall Area Below Grade _____ sq. ft.
5. Opaque [1] Basement Wall Area (A.3. + A.4. - A.1.b.- A.2.b.) _____ sq. ft. If the exposed area of A.3.is greater than the below grade area of A.4., add A.5. to A.7 and cross out the number in this cell.	6. Gross Heated Above-Foundation Wall Area, **including boxsill** _____ sq. ft.
7. Above Foundation Code Wall Area (A.6. + A1.b. + A.2.b.) _____ sq. ft.	8. Opaque [1] Above-Foundation Wall Area (A.6. - A1.a. - A.2.a.) _____ sq. ft.
9. Floor Area Over Interior Unconditioned Spaces Less Than 50° _____ sq. ft.	10. Insulated Roof Or Ceiling (less skylights) _____ sq. ft.
11. Exterior Floor Area (Overhangs) _____ sq. ft.	12. Crawl Space Wall Area _____ sq. ft.
13. Slab On Grade (above or less than 12 inches below grade) _____ lineal feet of slab perimeter	14. Total Heated Envelope Area (A.5 + A.7 + A.9 + A.10 +A.11 + A.12 +(A.13. × 2')) _____ sq. ft.
15. Percent Glazing (for Prescriptive Package Method, Section B, only) (A.1.c. ÷ A.7. × 100%) _____ %	16. Windows Description - Above-Foundation Windows: Frame type: ☐ Wood or Wood Clad ☐ Vinyl ☐ Metal Glazing type: ☐ Dual ☐ Triple ☐ Dual w/storm panel Dual-Glazing Air Space: ☐ 1/4' ☐ 3/8" ☐ 1/2" or more Features: ☐ Low-E ☐ Argon-filled ☐ Suspended film Foundation Windows: ☐ Vinyl ☐ Metal

B. Prescriptive Package Method (Skip this section if using the System Design Method of Sections C-F)
The prescriptive package method is the simplest method for determining compliance with the UDC insulation and window requirements. To use the prescriptive package method, enter your actual design values in the "Actual " row below. **For a component, with two or more areas of different insulation levels**, **such as windows,** either use the least insulating value for both areas or use the Weighted Average tables below. Multiply your % glazing by the glazing U-value to obtain your "Glazing Factor". Find the Prescriptive Table that applies to your space heating fuel and sheathing type. Select a package from the table that most closely matches the construction indicated on your plans. **Do not exceed the package U-values or glazing factor or fall below the package R-values with your design.** Transfer the R-Values and U-values to the blank table below in the "Allowed" row. Then proceed to Section F. See page 2 for detailed instructions for this section.

	Package #	% glazing	U glazing	Glazing Factor (% glazing × U glazing)	R wall	R ceiling	R Bsmt, Crawl Space, Slab or Floor	U door	U overall	Equip. Eff.
Actual	------	% (A.15)							----------	
Allowed		----------	----------	Max	Min	Min	Min	Max		

(Please go to Section F.)

Optional R-Value/U-Value Weighted Average Table for Component:

Component Construction Description	R Value	U-Value (1÷R Value)	Area (sq ft)	U-Value × Area (UA)
			Total Area =	Total UA =

_____ ÷ _____ = _____
(Total UA) (Total Area) (Weighted Average U-Value (for windows or doors))
_____ ÷ _____ = _____
(Total Area) (Total UA) (Weighted Average R-Value (for all other components))

Optional R-Value/U-Value Weighted Average Table for Component:

Component Construction Description	R Value	U-Value (1÷R Value)	Area (sq ft)	U-Value × Area (UA)
			Total Area =	Total UA =

_____ ÷ _____ = _____
(Total UA) (Total Area) (Weighted Average U-Value (for windows or doors))
_____ ÷ _____ = _____
(Total Area) (Total UA) (Weighted Average R-Value (for all other components))

C. Code-Allowed Heat Loss For System Design Method
Enter area values from Section A as notated and temperature differences per footnote 2 into this table and then multiply across by the electric or non-electric code-required U-value. Total the right column to find the total allowed heat loss factor.

Component	Area From Sect A.	× Required U-Value		= Heat Loss UA
		☐ NON-ELEC	☐ ELECTRIC	
8. Opaque Basement Wall [2]	(A.5.)	0.077 [3]	0.077 [3]	
9. Above Foundation Code Wall	(A.7.)	0.110	0.080	
10. Floor Over Interior Unconditioned Space	(A.9.)	0.050	0.050	
11. Roof or Ceiling	(A.10.)	0.026	0.020	
12. Floor Over Exterior	(A.11.)	0.033	0.033	
13. Crawl Space Wall	(A.12.)	0.060	0.060	
14. Slab On Grade ☐ Unheated ☐ Heated [3]	(A.13.) Lin. ft.	0.72 'F' 0.70 'F'	0.68 'F' 0.68' F'	
8. Subtotal				
9. Credit for High Efficiency Heating Plant: 1.18 for furnace or boiler >90% AFUE; 1.15 for heat pump> 7.8 HPSF, Otherwise use 1.0				×
10. Total Code-Allowed Heat Loss Factor				

D. System Design Method - Actual 'U' Values Of Your Home's Components

D.1. Above-Foundation Components - If applicable, check the appropriate typical component constructions listed below, and use the pre-calculated U values. If your wall construction is not listed, you may obtain a pre-calculated U value from the default U-Value tables in the UDC Appendix. (Note that the default Table 2 Wood Frame U-values assume no insulating sheathing which penalizes you if your wall does have insulating sheathing, then you may need to use the Manual Calculation section below.) If you are using exterior metal framing, then you must use the Metal-Frame Wall U-Values of the UDC Appendix. If your component construction is not listed here or in the default tables, you need to use the Manual Calculation section below to manually enter R-values for the different layers of building materials from the Typical Thermal Properties of Building Materials Table of the UDC Appendix, ASHRAE Fundamentals Manual or manufacturer's specifications. Total them across and then obtain the U-value by taking the reciprocal (1/R) of the total R-value.

Above-Foundation Walls	☐ 2X4, 16" O.C., R-13 batt, R-1 board: U - .079	☐ 2X4, 16" O.C., R-13 batt, R-5 board: U - .061
	☐ 2X6, 16" O.C., R-19 batt, R-1 board: U - .059	☐ 2X6, 16" O.C., R-19 batt, R-5 board: U - .049
☐ Other - describe:		U - from Default Table
Roof or Ceiling	☐ 2X4 truss, 24" O.C., with R-38 insulation: U - .030	☐ 2X4 truss, 24" O.C., with R-52 insulation: U - .025
	☐ 2X12 cathedral ceiling, 16" O.C., with R-38 insulation U - .027	
☐ Other - describe:		U - from Default Table
Floor Over Exterior or Unconditioned Space	☐ 2X10 joists, 16" O.C., R-19 batt: U - .047	
☐ Other - describe:		U - from Default Table

Manual U-Value Calculation (if assembly not listed above)

Component Name	Cavity Or Solid If Applicable	Ext. Air Film*	Ext. Finish	Insulation Over Framing	Shea-thing	Framing Or Solid	Insulation Within Cavity	Inter-ior Finish	Int. Air Film*	Total R-Value	U-Value
	Cavity					----------					
	Solid						----------				
	Cavity					----------					
	Solid						----------				

*** Air Film R-Values**

Location	Heat Flow Direction		
	Upwards	Horizontal	Downwards
Exterior	.17	.17	.17
Interior	.61	.68	.92

D.2. Foundation And Slab-On-Grade Components - Check appropriate boxes for planned type of construction to determine pre-calculated overall 'U-value' including air films, wall, insulation, soil and cavity/solid differences. Slab on grade F-values are per lineal foot of slab perimeter.

Component Type	U-Value	
Foundation Wall	**Basement**	**Crawl Space**
☐ Masonry or concrete wall without insulation	0.360	0.477
☐ Masonry or concrete wall with R-5 insulation board for full height	0.115	0.136
☐ Masonry or concrete wall with R-10 insulation board or R-11 insulation batt and 2X4's for full height	0.072	0.081
☐ Permanent wood foundation with R-19 batt for full height	0.054	0.059
☐ Basement or crawl space floor without insulation	0.025	0.025
Slab-On-Grade (or within 12 " of grade)	**F-Value**	
☐ Slab-on-grade without insulation	1.04	
☐ Slab-on-grade with R-5 insulation for 48" total horizontal and vertical application	0.74	
☐ Slab-on-grade with R-10 insulation board for 48" total application	0.68	

D.3. Windows And Doors - Use manufacturer's specifications for window and glazed door values, if they were determined per NFRC Std 100, to enter into Table E. Otherwise see default tables of UDC s. Comm 22.05 for U-values.

E. System Design Method - Calculated Envelope Heat Loss Factor Of Your Home

Enter values into table from elsewhere on this worksheet and multiply across to find the actual heat loss factor of each component. If using pre-calculated component U-values, **do not calculate separate cavity and solid figures or apply wood frame factors**. Total component heat loss factors in right column to find total envelope heat loss factors.

Component	Cavity Or Solid If Applicable	Area From Sect. A	× Wood Frame Factor**	× Actual 'U' Value From Sect. D	= Heat Loss Factor (UA)
Above-Foundation Windows	----------	(A.1.a.)	----------		
Foundation Windows	----------	(A.1.b)	----------		
Doors	----------	(A.2.c)	----------		
Opaque Basement Wall	----------	(A.5.)	----------		
Opaque Above-Foundation Wall	Cavity				
	Solid	(A.8.)			
Floor Over Unconditioned Spaces	Cavity				
	Solid	(A.9.)			
Roof or Ceiling	Cavity				
	Solid	(A.10.)			
Floor Over Exterior	Cavity				
	Solid	(A.11.)			
Crawl Space Wall	----------	(A.12.)	----------		
Slab On Grade	----------	(A.13.)Lin. ft.	----------	F-Value	
Total Calculated Envelope Heat Loss Factor- Not to exceed Total Code Allowed Heat Loss Factor of line 10 of Section C. (Enter here: _____)by more than 1%					

** Adjustment Factors For Wood-Framed Components - Do not apply if your are using a pre-calculated or default U-Value.

Spacing Of Framing Members	Stud Walls		Joists/Rafters	
	Cavity	Solid	Cavity	Solid
12"	.70	.30	.86	.14
16"	.75	.25	.90	.10
24"	.78	.22	.93	.07

F. Heat Loss Factor Due to Air Infiltration (for heating equipment sizing)

Enter appropriate values. A maximum infiltration air change rate of 0.5 per hour is allowed in addition to ventilation losses.

Floor Level	Area (sq ft)	× Height (ft)	Fan Capacity (cfm)	× Constant	× Air Changes Per Hour	= Heat Loss Factor(UA)
Basement			---------	.018		
Level 1			---------	.018		
Level 2			---------	.018		
Level 3			---------	.018		
Ventilation	----------	----------		.432	----------	
Total Infiltration & Ventilation Heat Loss Factor						

G. Heating Equipment Sizing

Enter appropriate value to determine the maximum and minimum allowable heating equipment capacity in BTUs/HR. A more detailed calculation may be submitted to the local code official. [4]

Prescriptive Package Method: _____ **U overall** from selected Prescriptive Package of Section B × _____ Total Envelope Area (A.14.) =	
OR System Design Method: Calculated Heat Loss Factor from Sect. E.	
Infiltration & Ventilation Heat Loss Factor (from Sect. F.)	+
Total Heat Loss Factor (UA)	=
Temperature Difference from **County Zone Table** on page 1	×
Minimum Heating Equipment Output	=
Allowable Heating Equipment Size Margin Multiplier	× 1.15
Maximum Allowable Heating Equipment Output [5]	=
Planned Furnace Output Or Boiler IBR Rating	
Make & Model if High Efficiency Credit has been taken:	

Prescriptive Package Tables (Corrected)

(See notes on page 2 of Energy Worksheet; I = insulating sheathing, RT = raised heel roof truss)

Table B-1 Prescriptive packages, Non-electric Heat, Structural Sheathing only

Package	Glazing Factor	R wall	R ceiling	R basement	U door	U overall	HVAC Equipment Efficiency
1	0.0370	R21	R42	R7	0.35	0.073	Normal
2	0.0264	R21	R51, RT	R5	0.35	0.073	Normal
3	0.0333	R15	R42	R10	0.35	0.073	Normal
4	0.0440	R19	R33	R10	0.35	0.073	Normal
5	0.0330	R13	R42	R11	0.35	0.073	Normal
6	0.0480	R19	R33	R11	0.35	0.073	Normal
7	0.0600	R21	R47	R11	0.35	0.073	Normal
8	0.0407	R13	R44	R13	0.35	0.073	Normal
9	0.0600	R19	R42	R13	0.35	0.073	Normal
10	0.0680	R21	R38, RT	R13	0.35	0.073	Normal
11	0.0296	R13	R49	R5	0.35	0.086	High
12	0.0440	R19	R30	R5	0.35	0.086	High
13	0.0520	R21	R33	R5	0.35	0.086	High
14	0.0720	R13	R47	R10	0.35	0.086	High
15	0.0784	R19	R38	R10	0.47	0.086	High
16	0.0640	R13	R33	R11	0.47	0.086	High
17	0.0896	R19	R49	R11	0.35	0.086	High
18	0.0896	R21	R34	R11	0.35	0.086	High
19	0.0920	R19	R34	R11	0.47	0.086	High
20	0.0840	R13	R49	R13	0.35	0.086	High
21	0.0840	R19	R30	R13	0.47	0.086	High
22	0.0896	R21	R31	R13	0.47	0.086	High
Package	**Glazing Factor**	**R wall**	**R ceiling**	**R crawl**	**U door**	**U overall**	**HVAC Equipment Efficiency**
23	0.0520	R19	R34	R19	0.47	0.070	Normal
24	0.0672	R13	R36	R19	0.47	0.083	High
25	0.0720	R13	R33	R19	0.47	0.083	High
Package	**Glazing Factor**	**R wall**	**R ceiling**	**R slab**	**U door**	**U overall**	**HVAC Equipment Efficiency**
26	0.0560	R21	R36	R5	0.47	0.103	Normal
27	0.0728	R13	R36	R5	0.47	0.121	High
28	0.0760	R13	R34	R5	0.47	0.121	High
Package	**Glazing Factor**	**R wall**	**R ceiling**	**R heated-slab**	**U door**	**U overall**	**HVAC Equipment Efficiency**
29	0.0560	R21	R47	R5	0.47	0.101	Normal
30	0.0728	R13	R42	R5	0.47	0.120	High
31	0.0760	R13	R38	R5	0.47	0.120	High
Package	**Glazing Factor**	**R wall**	**R ceiling**	**R floor**	**U door**	**U overall**	**HVAC Equipment Efficiency**
32	0.0480	R19	R47	R19	0.35	0.065	Normal
33	0.0728	R19	R36	R19	0.47	0.077	High
34	0.0560	R13	R34	R19	0.47	0.077	High

Table B-2 Prescriptive packages, Non-electric Heat, Insulating Sheathing

Package	Glazing Factor	R wall	R ceiling	R basement	U door	U overall	HVAC Equipment Efficiency
35	0.0370	R20, I	R42	R7	0.35	0.073	Normal
36	0.0363	R28, I	R38, RT	R5	0.35	0.073	Normal
37	0.0552	R18, I	R44	R10	0.35	0.073	Normal
38	0.0560	R20, I	R47	R10	0.35	0.073	Normal
39	0.0560	R23, I	R34	R10	0.35	0.073	Normal
40	0.0560	R18, I	R47	R11	0.35	0.073	Normal
41	0.0616	R23, I	R42	R11	0.35	0.073	Normal
42	0.0546	R18, I	R44	R11	0.35	0.073	Normal
43	0.0672	R23, I	R40	R13	0.35	0.073	Normal
44	0.0720	R25, I	R36	R13	0.35	0.073	Normal
45	0.0504	R18, I	R40	R5	0.35	0.086	High
46	0.0560	R19, I	R47	R5	0.35	0.086	High
47	0.0560	R23, I	R38	R5	0.47	0.086	High
48	0.0600	R25, I	R38	R5	0.47	0.086	High
49	0.0680	R26, I	R42	R5	0.35	0.086	High
50	0.0680	R28, I	R47	R5	0.47	0.086	High
51	0.0672	R26, I	R47	R5	0.35	0.086	High
52	0.0672	R28, I	R38	R5	0.35	0.086	High
53	0.0720	R20, I	R42	R7	0.47	0.086	High
54	0.0855	R18, I	R36	R11	0.35	0.086	High